

## 5 CLAIMS

1. A method, comprising:  
providing a block of IWT (integer wavelet transform) coefficients for at least one frequency sub-band of an image;  
determining a mean value of said coefficients within said block; and  
10 establishing an encoded mean value to embed one of a logical-0 bit value and a logical-1 bit into said first block.
2. The method of claim 1 wherein said establishing comprises:  
maintaining said mean value unchanged to embed a logical-0 value into said block.
3. The method of claim 1 wherein said establishing comprises:  
15 changing said mean value to embed a logical-1 bit value into said block.
4. The method of claim 1 further comprising:  
not using modulo-256 addition for grayscale values of pixels in a spatial-domain block affected by changes in said block of IWT coefficients.
5. The method of claim 1 further comprising:  
20 avoiding truncation of grayscale values of pixels in a spatial-domain block corresponding to said block of IWT coefficients without using modulo-256 addition on said grayscale values.
6. The method of claim 1 further comprising:  
correcting any erroneous bit arising from said establishing using error code correction
7. The method of claim 1 further comprising:  
25 identifying a distribution of grayscale values of pixels in a spatial-domain block affected by said IWT coefficients; and  
customizing said establishing according to said grayscale-value distribution.
8. The method of claim 1 wherein said IWT coefficients comprise:  
LL<sub>1</sub> coefficients.
- 30 9. The method of claim 3 wherein said changing comprises:  
shifting at least one coefficient of a block in an HL<sub>1</sub> sub-band by a shift quantity.
10. The method of claim 9 wherein said changing further comprises:

- 5 shifting at least one coefficient of an associated block in an  $LL_1$  sub-band by about one quarter of said shift quantity.
11. A method, comprising:
- dividing IWT (integer wavelet transform) coefficients for at least one frequency band of an image into a plurality of non-overlapping blocks;
- 10 determining a mean value of coefficients within a first block of said blocks; and
- modifying said mean value of said coefficients to embed one or more bits of data.
12. The method of claim 11 further comprising:
- identifying at least one coefficient eligible for modification by said modifying and at least one coefficient to remain unchanged during said modifying.
- 15 13. The method of claim 11 wherein said modifying said mean value comprises:
- adding a shift quantity to said mean value.
14. The method of claim 11 wherein said modifying said mean value comprises:
- subtracting a shift quantity from said mean value.
15. A method, comprising:
- 20 dividing IWT (integer wavelet transform) coefficients for at least one frequency band of an image into a plurality of non-overlapping blocks;
- determining a mean value of coefficients within a first block of said blocks;
- comparing said mean value to a threshold; and
- extracting a bit value from said block based on said comparing.
- 25 16. The method of claim 15 wherein said extracting comprises:
- extracting a logical-1 bit value from said block if an absolute value of said mean value exceeds an absolute value of said threshold.
17. The method of claim 15 wherein said extracting comprises:
- extracting a logical-0 bit value from said block if an absolute value of said mean value is less
- 30 than an absolute value of said threshold.
18. The method of claim 15 further comprising:
- correcting any bit error arising from said extracting employing error correction code decoding.
19. The method of claim 16 further comprising:

- 5 reducing the absolute value of said mean value by a shift quantity used during a preceding data embedding step only if said reducing does not cause an overflow or underflow condition for grayscale values of pixels in a spatial-domain block affected by said first block.